

AN ASSEMBLY OF A TUBULAR ELEMENT AND AT LEAST ONE PANEL,  
INTENDED IN PARTICULAR FOR USE IN OUTDOOR PLAYGROUND  
INSTALLATIONS

The present invention relates to an assembly of a  
5 tubular element at least one panel, intended in particular  
for use in outdoor playground installations.

BACKGROUND OF THE INVENTION

Numerous devices already exist for assembling a tubular  
element and a panel, said devices generally being complex and  
10 expensive.

OBJECTS AND SUMMARY OF THE INVENTION

The present invention seeks to provide an improved  
assembly that is easy to implement and that presents reliable  
strength characteristics, thus ensuring a high degree of  
15 safety in use.

The invention provides such an assembly, comprising at  
least one pair of fixing elements suitable for being mounted  
on the tubular element, and wherein the pair of fixing  
elements and the panel are configured in such a manner as to  
20 enable the panel to be held between the fixing elements, the  
fixing elements being disposed on either side of the plane of  
the panel.

By means of the invention, the panel is assembled in  
reliable manner with the tubular element, and can be held  
25 securely by the fixing elements.

At least one of the fixing elements may have a face for  
bearing against one side of the panel.

Preferably, at least one of the fixing elements has at  
least one fixing tab suitable for engaging in a corresponding  
30 slot made in the tubular element. The fixing elements may  
thus be mounted in simple manner on the tubular element by  
inserting the fixing tab(s) into the corresponding slot(s).

Each above-mentioned fixing tab may include a bearing  
surface suitable for bearing against an inside wall of the  
35 tubular element so as to lock the corresponding fixing  
element to the tubular element.

In a particular embodiment of the invention, at least one of the fixing elements has at least two fixing tabs suitable for engaging in the same longitudinal slot of the tubular element or in two respective slots. The two tabs may  
5 be offset relative to a central axis of the fixing element.

Each fixing tab may be configured in such a manner that when it is inserted in the corresponding slot of the tubular element, the fixing element can pivot relative to the tubular element, at least prior to the panel being put into place.  
10 The assembly can thus be set up in particularly easy manner since while the two fixing elements are being put into place on the tubular element, they can be spaced apart angularly in such a manner as to enable the panel to be inserted between them. Then both fixing elements, or only one of them, is  
15 subjected to pivoting relative to the tubular element in such a manner as to be pressed down against a corresponding side of the panel. The panel is then clamped between the two fixing elements.

In an embodiment of the invention, each fixing element  
20 has an opening and the panel has an orifice, and these openings and the orifice are configured in such a manner as to define a passage for the shank of a screw co-operating with a nut.

At least one of the fixing elements advantageously  
25 includes a setback suitable for receiving a nut or the head of a screw, the depth of the setback being selected in particular in such a manner as to ensure that the nut or the head of the screw is fully received therein. Thus, the nut or the head of the screw is set back from the outside surface  
30 of the fixing element, thus ensuring that a child playing on the playground installation does not suffer injury by contact with the nut or the head of the screw.

In a particular embodiment of the invention, the assembly may include at least one plug configured to be  
35 capable of being engaged in the above-mentioned setback so as to cover the nut or the head of the screw. The plug is advantageously configured in such a manner as not to project

from the setback when it is in place therein, and may include an end wall that co-operates with an outside surface of the fixing element to form a surface that is substantially continuous.

5       The plug thus serves to further improve the safety of the assembly by reducing the risk of children injuring themselves and of preventing acts of vandalism by disassembling the assembly, since it makes access to the screws difficult.

10       The plug may include a groove suitable for co-operating with a spline on the fixing element situated in the corresponding setback so as to provide a keying function.

Each of the fixing elements may be generally in the form of a half-shell.

15       The pair of fixing elements may be constituted by parts that are identical.

In an embodiment of the invention, at least one of the fixing elements is made by injection molding a thermoplastic material, and in particular a polyamide.

20       In a variant, at least one of the fixing elements is made of aluminum or of steel.

The assembly need not have any direct fixing means between the panel and the tubular element.

25       In an embodiment of the invention, the tubular element has a plurality of slots enabling at least two pairs of fixing elements to be fixed side by side.

30       The tubular element may have four slots disposed in a checkerboard configuration enabling two pairs of tabs to be received from two fixing elements, the four tabs then occupying a common row and a tab in each pair alternating with a tab in the other pair.

35       The invention also provides a fixing element for an assembly of a tubular element and a panel, the fixing element including at least one fixing tab suitable for engaging in a slot of the tubular element, and further including an opening enabling the shank of a screw to pass therethrough, enabling the panel to be held in place.

The invention also provides a tubular element for an assembly as defined above, the tubular element including four slots disposed in a checkerboard configuration.

5 The tubular element may have two slots that are longitudinally spaced apart along the axis of the tubular element.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Other characteristics and advantages of the present invention appear on reading the following detailed  
10 description of non-limiting embodiments, and on examining the accompanying drawings, in which:

- Figure 1 is a diagrammatic and fragmentary perspective view of a tubular element and a fixing element in accordance with the invention prior to being assembled together;
- 15 • Figure 2 is a diagrammatic and fragmentary perspective view showing the tubular element and the fixing element of Figure 1 after they have been assembled together;
- Figure 3 is a diagrammatic and fragmentary perspective view seen from above showing a panel inserted between a pair  
20 of fixing elements mounted on the tubular element, prior to putting the screw and the nut into place;
- Figure 4 is a diagrammatic and fragmentary perspective view showing the final assembly;
- Figure 5 is a diagrammatic and fragmentary plan view  
25 showing the Figure 4 assembly;
- Figure 6 is a diagrammatic and fragmentary perspective view of a fixing element and a plug in an embodiment of the invention;
- Figure 7 is a diagrammatic and fragmentary perspective  
30 of an assembly comprising two pairs of fixing elements for two respective panels, only two of the fixing elements being mounted; and
- Figure 8 is a diagrammatic and fragmentary perspective view of the Figure 7 assembly, with two pairs of fixing  
35 elements being mounted.

#### MORE DETAILED DESCRIPTION

Figure 1 shows a circularly cylindrical tubular element 1 having an axis X, for an assembly that is intended, in the example described, for use in an outdoor playground installation.

5       The tubular element 1, e.g. made of stainless steel, has two longitudinal slots 2 and 3 (visible in Figures 1 and 2). These slots 2 and 3 may be cut out by laser and they are offset longitudinally along the axis X.

10       These figures also show a fixing element 4 made by injection molding polyamide 6 and which is generally in the form of a half-shell having a central axis Y.

15       The fixing element 4 presents a first face 5 that is substantially plane, defining the base of the half-shell shape, and a second side face 6 shaped in such a manner as to match substantially the shape of the outside wall of the tubular element 1, as can be seen in Figure 5, in particular.

      The fixing element 4 is provided with two tabs 7 that are connected to the side face 6 and that are intended for insertion into the slot 2 of the tubular element 1.

20       In the longitudinal direction, the tabs 7 extend over a distance equal to the height of the slot 2 so that the fixing element 4 can be prevented from moving axially once it has been put into place on the tubular element 1.

25       As can be seen in Figure 2, the tabs 7 are disposed in the longitudinal direction closer to one edge of the side face 6 than to the other edge. In other words, the tabs 7 are offset relative to the central axis Y of the fixing element 4.

30       Seen from above, as shown in Figures 2 and 5, the tabs 7 are curved outwards so as to define respective bearing surfaces 8 for pressing against the inside wall of the tubular element 1 once the tabs 7 have been inserted into the slot 2.

35       Having tabs 7 of this shape allows the fixing element 4 to pivot relative to the tubular element 1 when it is in place on said tubular element.

In the example described, the fixing element 4 has stiffening ribs 9 on its first face 5.

5 A setback 11 is formed in the convex side of the fixing element 4 serving to receive completely a nut or the head of a bolt or screw, and in the end wall of the setback there is an opening 10.

The slot 3 of the tubular element 1 serves to receive a second fixing element 13 identical to the fixing element 4 described above, as can be seen in Figure 3, in particular.

10 Since the fixing elements 4 and 13 are identical, the tabs 7 on each of the elements are offset from the corresponding axis Y, with the longitudinal offset along the X axis of the slots 2 and 3 enabling the fixing elements 4 and 13 to be positioned so that they face each other since  
15 they are generally images of each other about the plane of the panel.

The slots 2 and 3 are spaced apart at a predetermined angle such that once the fixing elements 4 and 13 are in place on the tubular element 1, the panel 14 can be inserted  
20 between said fixing elements 4 and 13.

The panel 14 may be made of a thermoplastic material, for example of polyethylene, or indeed of plywood.

The invention is not limited to one particular type of panel, and the panel 14 may be rectangular as shown in the  
25 figures or else, in a variant, it may present any other shape, for example it may be generally disk-shaped or in the shape of half a disk.

The panel 14 has an orifice 15 for positioning in register with the openings 10 of the fixing elements 4 and 13  
30 so as to form a passage for the shank of a screw 17.

At the step shown in Figure 3, the panel 14 is positioned against the face 5 of the fixing element 4 and the fixing element 13 mounted on the tubular element 1 is in an angular position spaced apart from the panel 14. The fixing  
35 element 13 is then moved by pivoting relative to the axis X so as to be brought to bear against one side of the panel 14.

Once the panel 14 is engaged between the pair of fixing elements 4 and 13, the screw 17 is inserted into the through passage of the fixing element 4, the panel 14, and the fixing element 13, with the screw 17 being held in this passage by means of a nut 18 which is received in the setback 11 of the fixing element 13.

When the screw is tightened in the nut, the bearing surfaces 8 of the tabs 7 are pressed against the inside wall of the tubular element 1, thereby finally locking the assembly.

The depth of the setback 11 is selected in such a manner that neither the nut 18 nor the head of the screw 17 projects proud of the outside surface of the fixing elements 4 and 13, as can be seen in Figure 5.

The resulting assembly is of satisfactory appearance and provides good safety conditions for children plying on the playground installation.

In the embodiment shown in Figure 6, a plug 21 is provided for inserting in the setback 11 in each fixing element 4; 13.

The plug 21 is suitable for covering the nut 18 or the head of the screw 17, and presents an end wall 23 configured in such a manner as to co-operate with the convex surface of the corresponding fixing element 4, 13 to define a surface that is substantially continuous without significant sharp edges.

Each setback 11 includes a spline 20 suitable for co-operating with a groove 22 in the plug so as to perform a keying function.

In the example described above, the panel 14 is fixed by a single pair of fixing elements 4; 13 to the tubular element 1.

It would not go beyond the ambit of the present invention for the panel 14, in particular when of large size, to be fixed between two parallel tubular elements 1, the panel being held to each tubular element by two pairs of fixing elements 4; 13, for example.

Each tubular element may also be configured in such a manner as to enable two pairs of fixing elements to be assembled side by side in the same longitudinal position along the axis X.

5        One such tubular element 25 is shown in Figures 7 and 8.

One of the fixing elements 4 in each of the two pairs is put into place on the tubular element 25 via a slot analogous to the slots 2 and 3, as shown in Figure 7.

10        The other two fixing elements 4' shown in Figure 8 and designed to be positioned side by side are put into place on the tubular element 25 by engaging the corresponding tabs 7 in respective slots 26 of the tubular element 25.

15        These slots 26 are substantially square in shape and they are disposed in a checkerboard configuration, as can be seen in Figure 7.

Thus, after assembly, the tabs 7 of the fixing elements 4' bear against the inside wall of the tubular element 25 and are positioned one above the other in a single row and in alternation, as can be seen in Figure 8.

20        This makes it possible to assemble two panels 14 on a single tubular element 25, the panels in the example described extending at 90° to each other.

25        It can thus be seen that the offset disposition of the tabs 7 relative to the axis Y enables two fixing elements 4' to be mounted side by side on the tubular element 25.

In an embodiment that is not shown, the tubular element 25 may have four sets of slots 26 in respective checkerboard configurations that are spaced apart at 90° around the tubular element 25 so as to enable it to have four pairs of  
30        fixing elements fixed thereon enabling four panels 14 to be held.